Survival of Incubating Atlantic Salmon Eggs as a Function of Hyporheic Water Quality and Flow Regulation

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Abstract

Atlantic salmon *(Salmo salar)* egg survival is heavily dependent on the environmental conditions *in situ.*  The hyporheic zone is a dynamic area of mixing groundwater and surface water in the substrate where adult salmon dig redds and spawn. It is believed that flow regulation will alter temperature and DO (dissolved oxygen) concentration and impact the mortality, growth and development of Atlantic salmon eggs. Hydroelectric activities provide renewable energy but have a physical impact on salmon habitat and form barriers for salmon migration. An unanswered question; is to which extent is egg survival impacted by hydroelectric activities? In November 2011; eggs were planted in the Tobique river system, NB., placed in the streambed at 100, 200 and 300mm below the streambed at three sites downstream of dams in two regulated rivers; the Dee and the Serpentine and in an unregulated control river the Gulquac. Separate controls for base survival rate and transport/time taken to deposit the eggs were incubated at the Mactaquac Biodiversity Unit, NB. At each site temperature of surface water and at 300mm depth in substrate will be monitored for temporal and spatial variation in growth and development of the salmon eggs. The uppermost sites of the Gulquac and the Dee contain *in situ* oxygen optodes to monitor DO concentration within artificial redds. Egg survival will be monitored in conjunction with flow, DO and temperature data to assess the implications of hyporheic water quality and flow regulation.